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THE MAC FLYER - For Greater Safety in MAC Air Operations

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HUMAN FOD

How to become a "stupidity statistic."

By Lt. Jack Brennan, USN

NATOPS manuals suggest that procedures are no substitute for good headwork in an emergency. In many cases, specific procedures may not even exist. However, a truly creative aviator, lacking both a NATOPS manual and any semblance of common sense, can find many ways to get into, and out of, hair-raising situations. As a case in point, here's an event which occurred in my pre-Naval Aviation youth.

Had there been an emergency procedure designed to cover the predicament I found myself in, it would be called "Horizontal Pilot Lodged Aft in Tandem-Seat Aircraft."

I had just dropped off my second passenger at a controlled airfield after a local orientation flight, and was returning to my uncontrolled home field. The plane was my dad's World War II-vintage SNJ trainer, a 600-hp, radial-engined monster which was very effective at turning avgas into noise. My fuel state was slightly low, but a shortage of funding for non-contract gas (read "low on bucks") convinced me to take off for home without refueling.

Everything seemed fine as I climbed to 3,500 feet in a gradual left turn. As I throttled back, I noticed a loud rushing noise previously drowned out by the engine. Glancing back, I saw I had left the sliding rear canopy open after the last passenger exited. Now I was in a quandary. If I returned home with the back hatch open, my old man would blow his stack for my sloppy preflight. On the other hand, if I returned to the field I'd just left, shut down, unstrapped, and closed the canopy, I wouldn't have enough gas to take off.

My solution was to trim the airplane for cruise, unstrap, and turn around and try to reach the canopy handle. Unfortunately, the tubular steel rollover bar between the seats presented a formidable obstacle. Try as I might, I couldn't stretch far enough to reach the handle. Maybe if I squeezed a little bit further through the gap, I thought . . . that did the trick. I grabbed the handle and, with a healthy shove, closed the canopy.

Now, my problem was how to get back into the front seat. I was firmly stuck in the A-frame-shaped opening, pinned at the shoulders and rib cage. I had become **HUMAN FOD.**

A wave of panic washed over me as the plane began a shallow, turning descent. Luckily, I could reach the aft-cockpit stick and I clumsily leveled the wings and brought the nose up. I overcame a brief period of pilot-induced oscillations which started from the reversed stick movement needed (push down to go up) as I referenced the horizon at the plane's tail. Images of the SNJ auguring into the ocean with me wedged in the airframe flashed before my eyes as my breathing got heavier and my heart started pounding.

By this time, I was well out over the Catalina Channel and in no danger of violating any restricted airspace. Avoiding bugsmashers was a totally different story, however, since this area was a very popular training ground for student pilots. A Piper Tomahawk cruised by serenely off my right wing on a reciprocal heading . . . at the same altitude. I glanced at the guy in the right seat, his mouth open, as his head swiveled to follow me in the opposite direction. Not only would I probably be fish food soon, but I would also be listed in the FAA reports as "the guy flying around backwards," like something out of a bad Disney movie.

I had to laugh and was able to calm down enough to take stock of my situation. I began a very shallow left turn to orbit while I pondered my predicament. I considered pushing all the way into the back seat and flying home from there, but decided against it since I had no back seat time in the SNJ (which was hard enough to land from the front seat). I'd have some pretty fancy explaining to do. Solo flight from the rear seat in this bird is simply not done.

I decided flying from the back seat would be my last resort if I couldn't uncork myself. I took several deep breaths, relaxed, and exhaled as completely as I could, trying to think skinny. Inching my way backwards, I could feel my ribs ride over the steel pipes like the bumps in a corrugated washboard. By pressing my elbows together, I reduced my shoulder width a fraction of an inch, which, combined with some serious wiggling, allowed me to pop free into the front cockpit.

The whole affair took about 10 minutes, but seemed like hours. I truly felt as though I had been reborn. The rest of the flight was uneventful, and I recovered with a three-point greaser at home.

After shutdown, my dad asked how things went and, as casually as I could I replied, "No problems . . . just your everyday fun flight."

For about a year afterward, all I had to do to give myself a case of the heebie-jeebies was to think about that flight in the SNJ. I didn't tell anyone the story for two years. By that time, I got a chuckle from it, but I'm sure my fellow pilots now have the answer as to why my hair is prematurely gray.

As humorous—or horrifying—as this story is, it isn't worth the ink to write it unless I learned something from my experience. The first, foremost, and perhaps most obvious lesson, is that ignoring that quiet, but persistent, little voice of reason that says "this is stupid!" can sometimes be a fatal mistake.

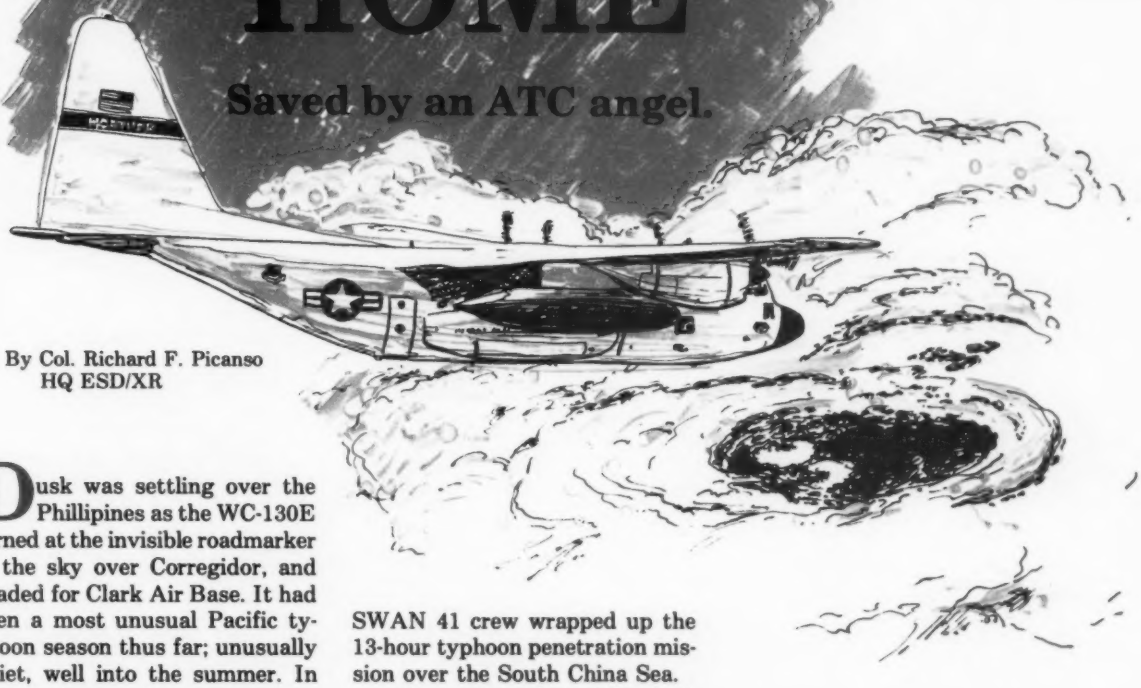
I know I heard the voice *before* I jammed myself into that tiny hole. Leaving the canopy open was my original near-fatal error. On reflection, I'm sure Dad would have preferred my landing with an open canopy rather than becoming a "stupidity statistic." (The SNJ flies perfectly fine, right up to Vmax, as a convertible.)

The other lesson is not as obvious: Leonardo da Vinci had it all wrong. Visionary genius that he was, he still never figured out that the prone position is no way for any self-respecting aviator to fly . . . whether pointed forward or aft. Five hundred years after Leonardo, I'm living proof of that fact.

Reprinted from *Approach*

WHICH WAY HOME

Saved by an ATC angel.



By Col. Richard F. Picanso
HQ ESD/XR

Dusk was settling over the Phillipines as the WC-130E turned at the invisible roadmarker in the sky over Corregidor, and headed for Clark Air Base. It had been a most unusual Pacific typhoon season thus far; unusually quiet, well into the summer. In fact, at the squadron picnic on the 4th of July, the principal topic of discussion among crews was: would there be a typhoon season this year? Several days later, however, the question was answered. Four, full strength typhoons, strung out across the vast Pacific; most of the squadron was deployed TDY, and there would be little rest for anyone until what turned out to be one of the busiest seasons on record was over in November.

There was an air of tired satisfaction on the flight deck, as the SWAN 41 crew wrapped up the 13-hour typhoon penetration mission over the South China Sea.

The copilot acknowledged initial radio contact with Clark as he and the pilot reviewed Dash One emergency procedures. He was happy to have drawn the 54th as a first assignment out of Little Rock. His goal in life was to reach the 1,000-hour mark that would let him begin AC upgrade. The way he was maxing out flying hours each month, he knew he'd be there by Christmas. He was particularly happy to be flying with the squadron safety officer this trip, an experienced major whose nickname was "Black Snake." The joke indicated he was the most safety conscious pilot in the squadron because he was the most snake-bitten and had the worst luck. After loosing an engine, he always reviewed the two-engine out procedures—and was often glad he did.

Behind them, the flight engineer alternately monitored instruments and dozed. It had been a long day since their alert at 0500 for their third mission in three days, with minimum 12-hour crew rest between missions. Each mis-

HONORABLE MENTION 1991 MAC FLIGHT SAFETY WRITING CONTEST

sion had required three typhoon penetrations, three hours apart, as well as a standard alpha reconnaissance pattern around the storm and the long flight out and back.

The navigator was exhausted. With a position fix and weather observation required approximately every 40 minutes out to the storm and back, and every 15 minutes for the 7-plus hours in the storm, neither he nor the Aerial Reconnaissance Weather Officer (ARWO) were feeling very energetic. They often joked that they were masters of the 20-minute nap between fixes, either at their positions or on the flight deck floor. They could only dream about the longer naps in a bunk the pilots enjoyed.

"You got it," the navigator sang out shortly after the WC-130 took up the initial course heading from Clark approach. He immediately put his head down on his ta-

ble for a few Zs before landing.

The ARWO was just as tired, but continued to wrap up his paperwork prior to the start of the pressure altimeter calibration on descent. He just wanted to be done with it. He had already closed out with Anderson Airways after passing the last weather observation to the SWAN weather monitor. At the rear of the cargo compartment, the dropsonde operator secured equipment and began his prelanding inspection.

The last penetration into Typhoon Rita had been particularly spectacular. It had been like flying into a giant cathedral, with a standard penetration at 700 millibars. Although the moon and stars glowed over the 60-nautical-mile-wide eye of the supertyphoon, the crew was surrounded by a circular wall cloud rising to 45,000 feet . . . a classic stadium effect. The sea below was calm, while 200-knot winds whipped up green sea spray under the wall cloud, continuously illuminated by lightning.

Heading for Clark, it was a typically beautiful tropical night. The moonlight shone down on a low undercast, obscuring any landmarks. The voice from RAPCON was young. It had that nervous tenor of youth under the stress of an important new responsibility. The pilots cleared away the books and settled down into the prelanding checklist. Both pilots and the ARWO, who was also monitoring Clark, became gradually aware of an increasing number of minor courses changes, accompanied by an increasing nervousness in the voice of the young controller.

"Looks like we drew the student section tonight," remarked the aircraft commander on interphone. The copilot nodded in agreement. There was, however, the beginning of a nagging concern in the back of the aircraft commander's mind. For, as the big Hercules entered the valley surrounding Clark, the frequency of course changes continued well above normal.

Suddenly, the Typhoon Chaser crew heard in a clear, firm, assured voice, "SWAN 41, EMERGENCY COMPASS OUT PROCEDURES, IMMEDIATE RIGHT TURN, START TURN NOW!"

The navigator shot up straight in his seat as if stabbed in the back with a giant icicle. As the pilot followed instructions into the turn, the navigator began an immediate compass crosscheck.

"SWAN 41, STOP TURN," came the command from the ground. The young controller sounded every bit in control of the situation, with a voice ringing out clear and confident.

The ARWO stepped up behind the pilots to add his eyes to theirs and the flight engineer's as they all saw the danger at the same time. Off to the left of the aircraft, on the course they had been following, the low cloudiness broke in the early evening moonlit sky to reveal one of the saddleback mountains surrounding Clark. The WC-130E had been on a collision course, well outside the boundaries of a standard Clark approach.

As every crewmember struggled to get their pounding hearts under control and the blood recirculating in their knuckles, the navigator explained the problem. The N-1 compass had apparently failed after passing Corregidor. With the navigator asleep, the pilots had been too busy or too tired to remember to do a compass crosscheck. The compass had appeared to be operating normally.

"It's not hard to see why we got all those course changes," said the pilot. "We must have been wandering all over creation."

Without further problems, the crew got into the pattern and landed safely. After the usual base ops stop, the crew bus made an additional stop. About 20 minutes later, the aircraft commander emerged from RAPCON and the bus headed off to billeting and the trailers.

"Well, I told that young controller she saved six lives tonight as well as an expensive airplane, the loss of which would have probably been attributed to pilot error. I also talked to the shift supervisor. While she didn't have a lot of experience she spotted the problem herself, called him over, and handled it herself."

"Somehow, just saying thanks to those folks isn't enough, is it?" asked the copilot retorically.

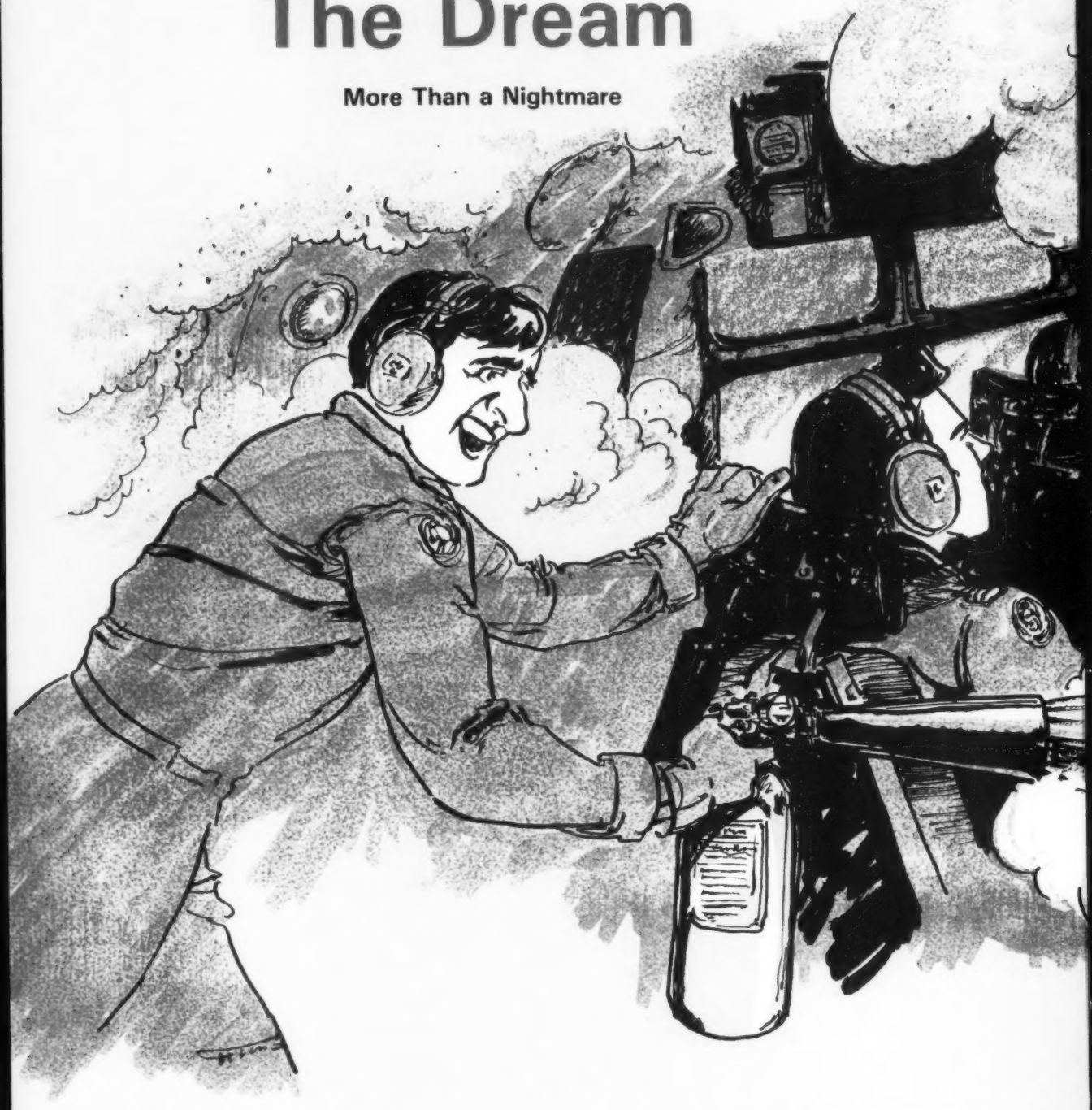
"Certainly not," replied the pilot. "Oh, sure, we'll have the old man write a nice letter to the Clark base commander. You know, great APR stuff and all that, but you are right, it's still not enough."

As the bus drove across the base to the crew trailers, each crewmember reflected on what had almost happened. The navigator was very quiet, as were they all. The aircraft comander was thinking about his call to the squadron commander and the necessary tightening up of crew procedures. Save for a sharp young professional who did her job, they'd never have gotten the chance to do better.

Col. Picanso, a 1968 ROTC graduate, received his basic meteorology training at New York University. His career as a weather officer took him from Westover to Guam, to Miami (as chief, Aerial Reconnaissance Coordination at the National Hurricane Center); to Andrews, Los Angeles AFS, and the Pentagon. Col. Picanso moved to his current assignment in 1989.

The Dream

More Than a Nightmare



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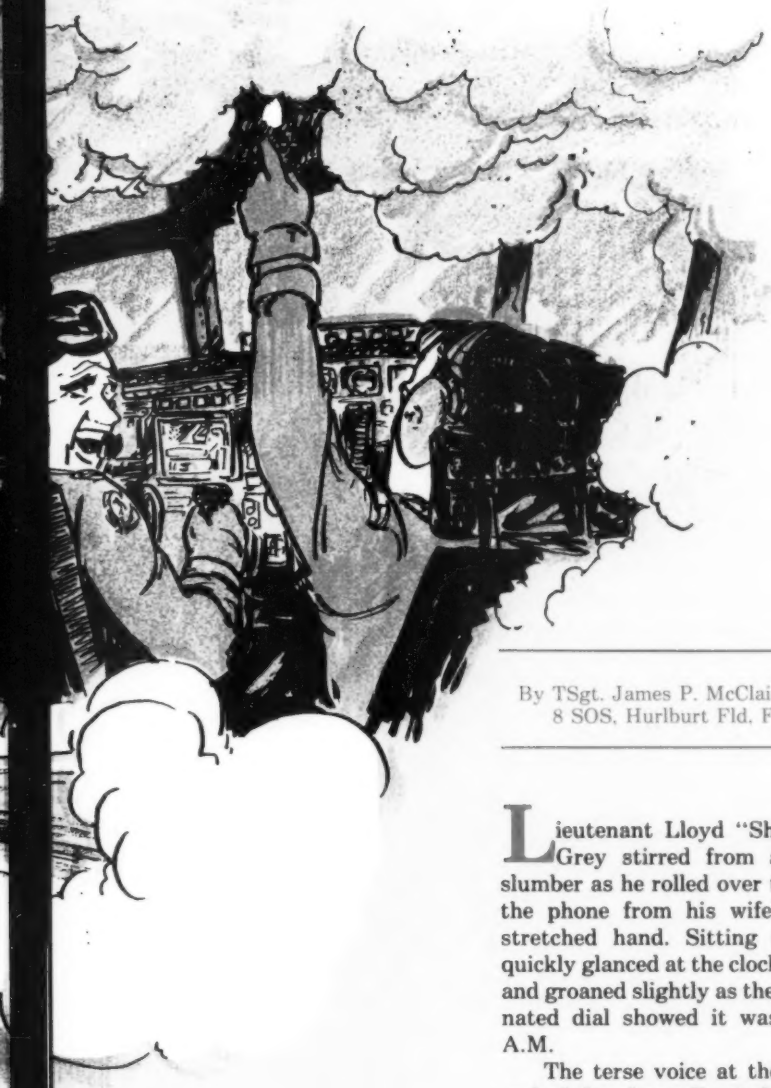


By TSgt. James P. McClain, Jr.
8 SOS, Hurlburt Fld, Fl

Lieutenant Lloyd "Shadow" Grey stirred from a deep slumber as he rolled over to take the phone from his wife's outstretched hand. Sitting up, he quickly glanced at the clock radio, and groaned slightly as the illuminated dial showed it was three A.M.

The terse voice at the other end of the phone directed him to report to the squadron, ASAP! He dressed quickly, grabbed his ever-ready mobility bag, and headed out into the morning fog.

A sudden sharp kick at his ankles brought Lieutenant Grey out of his fog-shrouded reveries. Confused and bleary-eyed, he quickly glanced at his surroundings and realized he had been dreaming. Before CMSgt. Walt "Wally" Jacobs, the loadmaster evaluator, could lay another size-11 hoof print on Grey's still-smarting ankle, the lieutenant was on his feet heading for the flight deck of the C-130 Mission Rehearsal Device (MRD).

The MRD or Medieval Rack Device, was the latest in technological improvements in the world of flight simulators. It combined the best of flight training aids and the worst of malfunction criteria. The device consisted of a flight deck module attached to a cargo compartment mockup. Entire missions could be preplanned on an advanced computer system, and loaded into the MRD master computer. Crews could actually fly a real world mission, complete with landmarks, threats, and weather conditions. This way, loadmasters would not be left out of the picture. The cabin was an exact duplicate, allowing them to perform all duties, including airdrops.

Lieutenant Grey climbed the flight deck steps to the noisy, EL-lit cockpit. A sudden lurch almost caused him to lose his balance. Putting out a hand, he grabbed the flight engineer's seat and waited as the cockpit shuddered once again. The wide grin on MSgt. Joe "Trashman" Burroughs' face didn't do much to ease the discomfort Shadow was beginning to feel. Quickly plugging into the ICS, adjusting the power seat, and scanning the video displays terminals, the young lieutenant keyed the intercom and announced to Maj. Dave "CRT" Green, the IP, that he was ready.

Though he was current on the "J" model Herk, Shadow was not as proficient as he wanted to be. At age 22, he was a combat veteran. Eight months before, the squadron had deployed to the Middle East, where, during the first few weeks of the war, he had flown

dozens of resupply missions in weather and combat conditions that had polished his green edge to a brilliant shine. The problem was that as the air war died down, the flying and proficiency levels dropped drastically.

There were things he'd learned in combat; little tips and techniques not found in the flight manuals. But there was also something to be said for "the basics." The command had had to face the fact that there were hundreds of crewmembers overdue training or currency events upon their return home. So, after taking leave, Grey found himself in phase for his annuals, block training, and simulator; events he hadn't accomplished since before the war.

Major Green and the rest of the crewmembers in the cockpit were pretty much in the same position. The only people proficient were the system operators, or "gremlins," who had been left behind.

The scenario for this MRD mission was a high-level descent into a low-level coastal penetration of a "foreign" country. This would be followed by a heavy equipment drop on an unmarked DZ, with more low level, ending with an air refueling and return home. Major Green accomplished the descent and coastal penetration relatively unscathed. The only problem had been when the yoke seemed a little stiff, resulting in a slightly higher angle of descent. Chalking it up to a gremlin-induced failure, the pilot had not mentioned it. He would perform the air refueling as Grey was not checked out in ARs.

"Copilot, nav," came a deep voice over the ICS.

"Go ahead, nav," Shadow replied.

"Bring up the nav course program on your VDT. I've made a couple of small course corrections you need to note," said Capt. Ron Brown, the navigator. As the lieutenant punched several buttons on his video display terminal, the navigator looked on.

"Pilot/nav. I'm getting stronger weather returns to the North; suggest we turn west for a few minutes . . . new waypoints on your screen now." Peering through the darkness, Green deftly aligned the IDS to bring up the weather formation. "CRT" had just fine-tuned the VDT picture when it suddenly bloomed, then faded. A "Warning" advisory on the main panel informed the crew the VDT had died.

"Eng/pilot, what's the deal?" asked Green. "Seems as if the Gremlins have struck again."

"More likely, a little too heavy on the switches," came a sarcastic call from the rear where the loadmasters, TSgts. Jim Smith and Paul Fredricks were preparing for the drop. They had nicknamed Green, "CRT," which the major thought was in reference to his dexterity in handling the aircraft computer screens. It wasn't until later he discovered his nickname was adapted from a well-known character in the command aviation safety magazine.

"Might as well give it up," Major Green decided. "Once the gremlins get into the system, there's no way to get things back." Lieutenant Grey was about to suggest something he had seen done in the desert, but thought better of it. He didn't know how the IP would take his suggestion.

"Crew, nav, 20-minute warning," announced the nav through the interphone. The crew settled into routine preparation for the airdrop. As the navigator made several updates into his system, the flight engineer noticed a very weak and intermittent engine-warning flashing on his screen. Before saying anything, he ran a quick troubleshooting routine he had learned in the desert, and gave a satisfying grunt as the light flickered off. "No need to bother anyone. Nothing serious, yet," he mused.

Captain Brown was about to call the "10-Minute-Warning" when his laser designator/IDS began to rotate uncontrollably. With practiced ease, he ran several procedures which failed to stop the unit from thumping against its stops. Out of desperation, the navigator reached across his desk and pulled the circuit breaker for the unit.

The engineer had noticed what Brown was doing, but said nothing. He knew it wasn't an established procedure. Besides, he had seen the same thing done in the desert. Just as Wally Jacobs strapped himself into a troop seat, he discovered a glow coming from the porthole adjacent to the number 3 engine. Still one of those few who really didn't understand the capabilities of the MRD, he unwisely unbuckled and walked to the porthole. Looking out, he could see a nighttime view of the right wing projected through a video monitor mounted to the porthole. Piercing the night were streaks of bright orange-white. Wally turned and yelled at the loads just as the cabin section heaved like a surfacing whale. His warning became a strangled yelp as he felt himself being lifted upward, then down. The cabin lurched and shuddered as the sounds of a runaway prop pierced the EL-illuminated cabin.

The loads were in the process of completing their 10-Minute-Warning checks when they saw the sudden glow and braced for what they knew was coming. Jim Smith was able to grab the right troop door handle and peer out. He could see another video monitor view of the number 3 engine tearing itself apart. Out of the corner of his eye he could also see the cause of the damage—a twin stream of tracer fire erupting from the darkness below. Screaming a

"No Drop" and "Triple A" warning over the intercom, he discovered his ICS was dead.

The "Warning—Caution" Advisory (WCA) Panel was lit up like a proverbial Christmas tree. The engine instruments for number 3 were gyrating wildly, and the copilot was shouting uselessly into a silent ICS. Just then, a twin streamer of AAA fire erupted past the copilot's windscreen.

Sergeant Burroughs had both hands tightly gripping the pilot's headrest. Repeatedly keying his ICS footswitch and getting no tone, he decided to take action on his own. Feeling his hands move, he was surprised to see the pilots' powered seats moving forward toward the yokes and control panels. He could see the major scrunched back in his seat, feet on the footrests as the control yoke threatened to break his legs. The copilot was doing his best to assist, but since neither had a foot on the rudder pedals, the task was becoming impossible. The AAA fire coming closer was the least of his worries. Without aircraft control, the only evasive maneuvering they were going to do was into the side of a mountain, one each, simulated. Taking a deep breath, the engineer reached down and pulled the "Yoke Stabilization" and "Seat Power" circuit breakers.

At the same time, Captain Brown was covered in a flash of sparks. The control panel to his right had overloaded and short-circuited. The navigator unbuckled his harness, grabbed the nearest fire bottle and discharged the agent. When nothing happened, he cursed and jumped down the flight deck steps in search of another bottle.

Upright once again, the flight engineer saw the vacant nav station and smoke. He reached for his own quick don "bubble" mask and put it on, yelling at the pilots to do the same. Peering through the haze, he was surprised to see the WCA panel still illuminated with a fire warning for number 3 engine. Obviously the Automatic Fire Extinguish circuits had malfunctioned. Trashman reached up, pushed the individual button for number 3, and was rewarded by nothing! Thinking quickly, he reset the circuit using a technique from the field.

Again nothing. As he pushed a sequence of switches, the system came back.

"Airspeed-Altitude" came a female voice over the ICS. Startled, the pilots realized the intercom had come back and they were hearing the "VAS" or Vocal Alarm System. It functioned as a vocal emergency checklist, providing the flyers with an extra "set of senses" during in-flight emergencies. Once again the "Airspeed-Altitude" call came over the intercom, followed by "Throttles-Advance" and "Yoke-Pull Back."

As CRT responded to the commands, Shadow donned his own mask. Taking a deep breath, the bubble collapsed inward since he had forgotten to activate the oxygen panel. The panel functioned as advertised, flooding the copilot's mask with 100 percent oxygen and pressure.

Not knowing where they were, the copilot keyed his mike and called the nav. Hearing nothing, he looked back and saw the still vacant nav panel.

The navigator was just about to climb the flight deck steps with a new fire extinguisher when the right forward and empennage electronics racks exploded. Smoke and sparks filled the cabin as several equipment panels fell to the floor. Sure the loads would know what to do, he moved forward.

About the time Captain Brown sprayed the still smoldering nav panel with the simulated agent, another female voice called "Slow Down Warning-Auto Drop-Opening Sequence!" Dropping the extinguisher, he jammed his headset on and frantically punched the ICS button.

"Pilot, nav. Didn't anyone call a 'No Drop'? There's a fire in the cabin and the nav systems locked up!"

In the cabin, Paul Fredricks was helping Chief Jacobs to his feet. The evaluator had stumbled trying to return to his seat during the engine fire and loss of control gyrations. Seating the Chief, the loadmaster grabbed a fire extinguisher to contain the right forward electronic rack fire. Sweating through his quick don, he applied the agent directly to the rack, knowing the simulated fire wouldn't go out until the detection sensors were covered by the agent. Fredricks was so intent on fighting the fire, he barely noticed Jacobs pulling his arm and pointing to the rear where the other loadmaster was fighting the fire in the tail-mounted electronics rack. Through the smoke-filled cabin, Fredricks could see the cargo door and ramp begin opening sequence. Keying his ICS, he screamed desperately, "Pilot, load. Stop Opening Sequence . . . loadmaster in the tail!"

"Pilot's taking Manual Control! Reset all systems. Abort the rehearsal!"

"Opening Sequence Initiated" intoned the female voice again. Seeing the Door Warning light illuminate, Major Green knew he only had seconds before the Load was crushed by the door.

Sergeant Smith was sure he had gotten the fire out when he felt the cargo door begin to move. Blinded by the smoke and off balance by the walkaround bottle, he tried to jump for the extraction chute deployment line. Just as his fingertips touched the line, he felt a foot fall through a storage bin cover. He was now hanging off the door by one leg.

"Negative on the manual control. Something's overridden the safety switch," cried the copilot. Instinctively, the engineer reached across the spaces for the LD/IDS circuit breaker. Hoping it tied into the override system, he pushed the breaker in.

"Auto drop cancelled. Opening Sequence cancelled. Simulation Aborted," said the voice as the MRD lit up.

Debrief was longer than usual. A few individuals such as the Wing DO, Stan eval, safety, and others were in attendance.

Realizing he was as much responsible for the day's events as the AC, the wing DO began running the videotape of the mission.

As the video ran, Major Green was the first to speak. "During the descent from altitude, I encountered some resistance in the control yoke. While it caused an increase in our angle of descent, I didn't have any trouble overriding it and maintaining control. I didn't feel it was serious enough to tell the engineer, and besides, I thought it was just another gremlin trick. Since I had exhausted all the procedures and techniques I could recall, I felt there wasn't any need to ask anyone else their opinion."

Just as the video was being fast-forwarded to the pilot's VDI failure, Lieutenant Grey held his hand up and, clearing his throat, said "Stand by one, there's something we missed. Take it back to the part where I got into the seat. Did anyone notice what I did when I sat down? I strapped in, adjusted my seat, plugged into the ICS, and started flying. What I forgot to do was check my oxygen panel. I didn't look at the regulator setting and didn't adjust the quick don for myself."

Sergeant Burroughs decided to save some time by bringing up his own perceived failures on the mission. "Don't need the videotape, but go ahead and I'll show you where I screwed up." As the tape focused on his actions with the first engine warning, he spoke slowly and softly. "I thought it might just be a panel fault and not a real indication, so I went ahead and used a routine I came up with in the desert. It worked and I let it go. Where I really messed up was when I saw the nav doing his thing with the runaway LD/IDS, and let myself get distracted by trying to trick the fire warning system," his voice rising, "with techniques, instead of established procedures. If I'd stuck to the books, we could have saved a lot of time and grief."

As the video rolled past the engineer's actions, Captain Brown felt a shiver run up his spine as it stopped at the point where he was caught, red-handed, pulling the circuit breaker on the LD/IDS. "Here I am" he said, "shutting down the LD/IDS. I tried everything in the book, but let myself get rushed by the drop checklist. When the book procedures didn't work, I used the techniques we developed during the deployment. I didn't realize there may have been a problem with the Auto Drop System since we never used it in the desert." Regaining his composure, he continued, "When the fire broke out and the extinguisher didn't work, I forgot all about the drop. I thought someone else would see me fighting the fire and turn off the drop."

Chief Jacobs shifted in his seat as the video showed him getting up to casually investigate the engine fire. "I've never realized that the whole purpose of the MRD is to allow us to make mistakes and live. Maybe I've tried to avoid becoming as computer literate as I should have. I was brought up when flying was done without all the gizmos and gadgets." A slow grin crossing his face as he mumbled, "My kids have more computer time at home than I do at work. Maybe I'm just trying too hard to resist change."

Everyone stared intently at the video as it fast forwarded to the point where Chief Jacobs grabbed Sergeant Fredricks' arm and gestured to the rear of the cabin. The camera focused through the smoke on the image of Sergeant Smith, fighting the electronics fire in the tail. When the door began to open, a loud cough broke the silence.

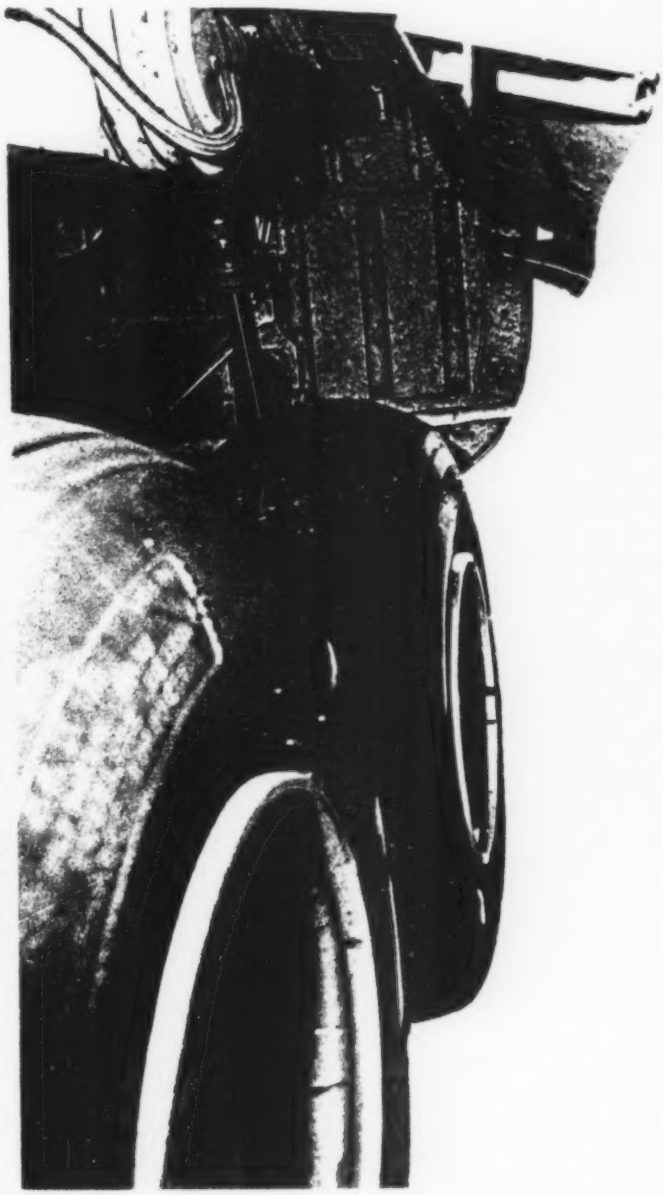
The wing DO quickly stood up as the room lights went up. He knew everyone was thinking about the lessons learned or forgotten. Deciding the best course of action was reinforcement, he spoke. "What happened here today doesn't mean that any one person failed. Maybe the system failed. We're counting more and more on technology to perform functions that one or more crewmembers used to do. Our crews are getting smaller, but the tasks are becoming more complex." Seeing a few lowered heads, he raised his voice slightly, "You each performed your assigned tasks in the manner you felt proper. Right or wrong, you did what you thought to be correct. I can't assign blame where learning is proven to benefit."

With all eyes on him, he completed the debrief by stating, "When a person learns from a situation, he needs to make sure others learn too. We got lucky in the MRD. I'm making a call to the staff tomorrow and recommend our training program be reevaluated and proficiency levels checked." Turning to the stan-eval reps, he said, "I want a 'lessons learned' package drawn up immediately. Have every single technique, procedure, and trick we developed in the deployment put down on paper." Looking at Sergeant Smith, he spoke quietly "We may need it to save somebody's life someday."

C-141 Tires vs Operational Needs and Concerns

A Look at the Problem

By MSgt. Daniel H. Bueve
20 MAS, Charleston AFB SC



Everyone is aware of the problems the C-141 fleet is experiencing with tire failures. As a point of reassurance, the people responsible for good, safe, and reliable tires know of the problems and are hard at work solving them. This article provides some background on what the problems are, what is causing them, and what the future holds. I have also provided helpful techniques for operating at high gross weights.

DESIGN

The C-141 tire is a 1950s tire design using the best knowledge and technology of that time. Tires have not changed very much since the baseline was established. The C-141A original maximum ramp gross weight was 318,000 pounds. The tires selected, tested, improved, tested again, and then approved, met this criteria. In late 1974, the maximum ramp gross weight of the C-141A had already been raised to our present 325,000 pounds. At that time, there was no emergency war planning (EWP) weight range available to flight crews. Experience from a number of areas, but primarily the June-July 1978 Zaire contingency, revealed the need to provide this information. Tires were evaluated for EWP weights

in the 1979-1980 time frame, and some changes made. In 1980, the EWP weights were incorporated into the -1 and 1-1.

Present C-141 tires have 28 plies of nylon cord. They can be new or recapped, and are subjected to a number of stresses affecting their performance. Testing revealed that the best deflection of the tire's sidewall for maximum tire life is around 32 percent. The C141-A's maximum weight of 318,000 pounds produced a 34.8 deflection in the sidewall. This was not a bad tradeoff since it reduced the sidewalls' life by a very small amount. This 34.8 percent deflection was based on servicing the tire to 195 psi. Raising the tire pressure to 205 psi resulted in a deflection reduction to 34 percent. As the air pressure is increased, a large reduction in deflection results. However, the tire can only support a given amount of internal air pressure. The safe, recommended maximum amount is 210 psi when operating above 325,000 pounds. Other factors must be considered when determining tire pressures, and engineers have determined that 190 psi is best for normal operations.

OPERATIONS

Operations Desert Shield and Desert Storm caused the C-141B priorities to shift to a maximum cargo hauling capacity vs long programmed life. Airframe time, wing life, and other areas, including the tires, were affected. The single biggest factor affecting tires is hot temperatures—the kind generated by moving the aircraft from parking to liftoff, and landing to parking. Nylon loses its strength after repeated exposures to heat buildup. Taxiing out of parking causes tremendous stress on a tire, especially at heavy gross weights. This stress is mostly from turns. The sharper the turn, the greater the sidewall deflection. This deflection stretches the nylon toward a maximum stress level and produces additional heat. The deflection is more pronounced in the aft tires on the inside of the turn. Unless the tire is new, previous ground operations have already left unseen stress wear in the sidewall. After cumulative effects, all it takes is a final stress on a tire and typically, the sidewall fails.

Landing the aircraft produces considerable stress on sidewalls. The initial touchdown impact flexes the tire as it takes the impact of aircraft weight. Compression drives the temperature of the tire up, and the tire is further stressed as it drags along the runway, rapidly spinning-up to aircraft speed. Deceleration of the aircraft and braking, if used, increase friction temperatures and stress on the sidewall. All of this results in a large temperature increase in a very short period of time. The situation is further aggravated if you make the first turnoff and head for parking. Now that the tire is warmed up, we place additional stress on the sidewall making turns during taxi. Granted, the weight of the aircraft is not as great as it was for initial taxi-out, but the tire was relatively cool prior to that event.

When Operation Desert Shield started, aircraft weights went up very quickly from 325,000 pounds ramp weight to the EWP maximum of 344,000 pounds. This did not happen in every instance; most aircraft weights were somewhere in between. There was considerable rush to get aircraft down range and some aircrews forgot the 210 psi tire pressure restriction when operating above 325,000 pounds. Other flight crews, when informed that accurate tire pressures could not be obtained until four hours after landing, elected to forgo the check. This time limit is required to allow tires to cool sufficiently to get an accurate reading of tire pressure.

C-141A GEAR DESIGN

The C-141 has a little-known design factor greatly affecting the problems we operators encounter. The inboard main gear tires support more aircraft weight than the outboard tires.

As the table depicts, an aircraft weight of 318,000 pounds and a CG of 30.8 percent places 297,656 pounds of total weight on the main gear. The

RAMP GROSS WT	TIRE PSI	CSG%(MAC)	NOSE GEAR WT	MAIN GEAR WT	INBD TIRE WT	OUTBD TIRE WT
318,000	195	30.8	20,344	297,656	42,207	32,207
324,000	195	30.8	20,728	303,272	42,989	32,829
344,900	195	30.8	22,068	322,832	45,761	34,947

inboard main gear tires support 168,828 pounds, where the outboard tires support 128,828 pounds. Each inboard main tire is subjected to a greater load than we would normally suspect.

We discussed earlier the tire deflection figures of 34.8 percent with a ramp weight of 318,000 pounds. This figure equates to the inboard main tires each supporting 42,207 pounds. The outboard tires will have less deflection. Another method of observing tire deflection, and therefore stress, is the tire footprint.

TIRE FOOTPRINT

Tire footprint increases with aircraft weight. An aircraft weighing 173,298 pounds will have an inboard tire footprint 16-inches long and 9.5-inch wide, with an area of 103.8-square inches. This tire is supporting a relatively light weight of 23,040 pounds. Raising the gross weight to 288,882 pounds results in the same tire now having a footprint measuring 20-inches long and 10.75-inches wide, with an area of 167-square inches supporting a weight of 38,400 pounds. These figures are based on a minimum tire pressure of 185 psi. As the tire pressure increases, the footprint decreases.

This surface area increase of 48 percent generates more heat because of friction. The reduced height of the tire, and greater sidewall deflection as the weights are increased, subjects them to more stress. The real problem, however, comes from turning and scuffing tires in a turn. The greater the surface area, the greater resistance and more force is applied to the sidewalls to get the tire moving.

RECAPPED TIRES AND EWP OPERATIONS

How does this affect C-141 operations? Normally, it does not. The USAF and numerous other government and private sector agencies use retread or recapped tires. These tires have proven to be reliable in day-to-day operations.

Emergency war planning operations, however, took the recapped tires into a new arena. The original purpose of recapping was to save cost by reusing expensive tires through retreading with a new layer of tread. Most tires are removed from operation because of tread wear rather than sidewall damage. Occasionally, under normal weight limits, we experience recap failure. Considering the cost involved, this is a very acceptable tradeoff.

The reason recaps fail more often than new tires is simple—they are required to pull double-duty on our aircraft. EWP operations, as discussed, create even more stress than normal. Now the same tire, required to produce more than it probably did during its first life, fails.

LIVING WITH THE PROBLEM

MAC, along with Air Logistics Command, decided to restrict recapped tires from inboard gear positions where greater weights and stresses are applied. Once available stocks of recapped tires are depleted, no recapped tires will be used on C-141 aircraft. This is good news. However, the use of new tires, with no recap capability, will dramatically increase our costs. It's the only way to solve the problem unless we stay below EWP weights. You, the operator, can help reduce tire stress by:

1. Ensuring tires are serviced correctly when operating in EWP weights. It might be necessary to consult controlling agencies and suggest a delay until tires are properly inflated.
2. Try to have the tires serviced prior to loading. This helps reduce stress.
3. Gentle brake application, slow taxi speeds, and gradual turns will all reduce stress.
4. Try, when possible, to limit taxi time and avoid excessive braking to make the first turnoff after landing.
5. Remember—600 FPM is the maximum sink rate for landing. It's governed by gross weight or fuel weight, and may be less than 600 FPM.

NEW PROGRAM—PROBLEMS

With all this, why not just buy new tires? Good question—but not a simple answer. The C-141 is the only aircraft in the inventory using these tires. New tire designs are being researched. The Aeronautical Systems Division will be testing a new 32-ply tire as one replacement option. New technologies and tire construction techniques are a factor. To make a tire stronger, we could use steel cord; however, this is a very expensive option. One or two more nylon cords would solve some of the problems, but each tire can only handle so much weight. This is one reason the C-5 has so many tires.

Testing will confirm whether the gear well can accommodate a tire with more than 28 plys, which some experts believe are all we can accommodate; others are not sure. Further testing will confirm how much tire growth due to tire acceleration on takeoff the gear well will contain. C-141 tires are not stopped prior to entry into the gear well, but simply slowed down and stopped after retraction.

When the aircraft is rejected on takeoff roll, even though little or no braking action is used, the stresses are there. The process of taxiing back for another takeoff may take the tire well beyond its failure point.

I would like to thank Mr. Frank Giffin, of the C-141 Tire Managers Office, Air Logistics Command, at Ogden UT, for his help in compiling some of the technical material presented here.

ONE-AIRFRAME — MANY-MISSIONS

Vandenberg's only hangar is home to its only flyers.

While most visitors to Malmstrom just see the SAC side of operations . . .

By Maj. Thomas A. Farrier
Headquarters MAC/SEF

The UH-1N Twin Huey is the Air Force's most abundant helicopter airframe. Operated by four major commands (MAC, PACAF, AFSC, and TAC), the "N-model" performs five primary missions in MAC: VIP airlift (at Andrews and Ramstein); training (at Kirtland); missile site support; USAF Survival School support; and range support for the Western Space and Missile Center. The 37th Air Rescue Squadron's (ARS) four UH-1N-equipped detachments handle the three support tasks. To get a better idea of how MAC's "light-lift" workhorse meets such diverse requirements, *The MAC Flyer* took a tour of those four rescue units to take a firsthand look at the unique contributions each makes to the UH-1N's superb operational and safety record.

No one can call the 37 ARS, based at Francis E. Warren Air Force Base in the southeastern corner of Wyoming, a "little operation." Lt. Col. Mike Wiram, the

squadron commander, and his small staff handle three different types of support missions, spread out over eight detachments in seven states. While the squadron's 20 HH-1H single engine helicopters support Strategic Air Command missile sites at four of those detachments (previously profiled in *TMF* May '90), it also operates 24 UH-1N helicopters to support not only SAC, but Air Training Command and Space Command as well. The unique missions and geographic settings of the four bases served by 37 ARS UH-1Ns present very different challenges to both aircraft and crews that fly them.

What started out as a cavalry fort has become the home of SAC's 90th Strategic Missile Wing—the first to field the LGM-188A Peacekeeper ICBM—and of the 37th Air Rescue Squadron. In addition to hosting 37th's administrative headquarters, F.E. Warren has the distinction of being the only base in the Air Force with both an operational flying mission, and no runways! Detachment 10 of the 37th operates its own "base operations," manages its own "airfield facilities" (helipad, ramp, and slide practice area), and welcomes any aircraft capable of landing at KFEW—in other words, transient helicopters. While a number of pilots from "upstairs" (squadron headquarters) are attached to fly with Det 10, the detachment has its own full complement of pilots to support both its primary missile site support mission and its secondary Military Assistance to Safety and Traffic (MAST) mission.

The MAST mission is an Army-managed program designed to fill in with military helicopter resources in areas which lack commercial emergency medical services facilities. Detachment pilots are justifiably proud of the hundreds of lives saved through their participation in the MAST program, and will gladly point out the huge scoreboard of successful missions covering a multi-story expanse of wall in their operations hangar. Meeting 24-hour-a-day requests for support for both operational taskings and lifesaving MEDEVAC flights, the UH-1N aircraft and Det 10 pilots serve both their customer and their community.

Average winter temperatures take a nosedive as we follow the trail of the UH-1N north from Cheyenne toward Great Falls, Montana, home of a world-renowned "cowboy art" museum and of Malmstrom Air Force Base. Until recently, a SAC air division oversaw the operations of Malmstrom's separate bomb and missile wings. As a part of the reorganization affecting us all, those organizations now work cooperatively but independently. At times, both call upon the services of the 37's Det 5, which is primarily geared toward supporting the missile wing, but frequently participates in base-level exercises involving the bombers and tankers as well.

Det 5 boasts the largest number of aircraft of any 37th detachment—eight N-models. The extra Hueys and pilots that go along with them are necessary to cover the more than 23,000 square miles of facilities run by the 341st Strategic Missile Wing. While occasionally asked to provide MEDEVAC assistance, Malmstrom crews are usually kept busy just staying on top of their demanding support taskings. On the morning *TMF* watched operations unfold, one aircraft and crew were TDY, another was on its way to Minot on an out-and-back mission, two others were working out on the fringes of the missile field in support of a missile movement, and a fifth was being subjected to multiple engine runs to bring it back on line. Operations Officer (now detachment commander) Maj. Brian Livie's only observation was a laconic "This is about average." The UH-1N is an ideal helicopter to assign against such high-tempo operations, particularly where winter temperatures plummet far below 0° F. The relatively compact design of the airframe permits hangaring for virtually all kinds of maintenance not requiring actual engine runs. The aircraft itself can operate safely in temperatures as low as 60 below, although numb feet and frozen breath are the rule when the mercury dips that low, since the UH-1N's cabin heat is exclusively bleed air-driven.

Travelling from the northernmost reaches of the Missouri River to Spokane, Washington, takes us across the Continental Divide and into a vastly different climate and terrain. The "Inland Empire" of eastern Washington State is probably familiar to a large number of MAC crewmembers who have undergone training at the USAF Survival School based at Fairchild AFB, 15 miles west of Spokane. Those who have been there also recall an even more intimate, ground-level familiarity they may have gained in the Survival School's field training area near Cusick, Washington, about 80 miles north of the main base.

Detachment 24, 37 ARS, is the only part of the now-disbanded 40th Aerospace Rescue and Recovery Squadron still in operation. It was transferred to the 37th and given new life quite simply because it is indispensible to the Survival School's mission. A detachment helicopter and complete crew are always in place at a forward operating base adjacent to the field training area whenever students are in the field. During the day, the crew flies sorties in support of school training events, accepting vectoring instructions

. . . the MAC Eagle proudly flies at the north end of the runway.

from students and demonstrating the procedures used for rescue hoist recovery. The crew is always on standby however, against the very real possibility that someone may get hurt somewhere in the rugged wilderness. The unit's list of "saves," steadily inching toward the five-hundred mark, testifies to their value. The Commandant of the Survival School, Col. David R. Lloyd, described himself and ATC as "supremely pleased" with Det 24's support, noting that the detachment extends every effort toward meeting all requests for assistance from his staff and instructors. While hardly a mainstream 37th ARS unit, Det 24 carries out its one-of-a-kind mission with dependability and pride, courtesy of its trusty Hueys.

The flexibility and reliability of the UH-1N weapon system makes itself known in quite a different way at Vandenberg AFB. We may think to ourselves, "California! Dream duty!" For some, this may be the case. For flyers, especially Detachment 8 pilots, (the only active duty pilots assigned to the base), the dreams are frequently of the sort that come after a midnight pizza. While BX T-shirts extoll the virtues of Vandenberg in terms of vultures and other marks of desolation, to flyers, Vandenberg means fog—and plenty of it.

"We have some of the worst fog you've ever seen around here," explained Maj. Mark Foster, detachment commander. "It rolls in off the Pacific and shuts everything down. You can be out flying a training mission less than 20 minutes away and have to drop everything and run for home before you get weathered out!" While helicopters can and do land almost anywhere when the weather gets bad, this is never a desirable alternative. In Det 8's case, they also have to cope with large sectors of "no-fly" airspace hemming them in from the east, further cutting their options when the weather goes down. This has led unit pilots to seek as many opportunities as possible to polish their instrument flying skills, not generally a high priority in the mainly VFR helicopter world. While not an ideal platform for conducting extensive instrument operations, the UH-1N fleet is fully equipped and certified for IFR flight, and the recent addition of glide slope receivers to extend the communications/navigation suite has made low approaches a lot less nerve-wracking.

Det 8 exists to serve mainly space-related support functions. While primarily flying missions covering the sprawling 98,000 acres of base property and offshore facilities belonging to Space Command's Western Space and Missile Center, detachment crews also team up with UH-1N crews from AFSC to cover Space Shuttle takeoffs and landings at Edwards AFB. As is the case with the 41st Air Rescue Squadron's H-3s (see *TMF* Sep 91), Det 8 crews sit alert during launches to cover possibility of various contingencies requiring the Shuttle crews to make an immediate landing. While the Patrick rescue crews anticipate options which could result in a return to the Kennedy Space Center, Edwards and Vandenberg crews, sometimes with augmentees from other 37 ARS bases, stand ready to respond to situations which might require a one-orbit return to Edwards. They are also on hand for scheduled Shuttle arrivals at Edwards.

Like their counterparts at F.E. Warren, Malmstrom, and Fairchild, Vandenberg crews serve their customers with the proven, reliable, and versatile UH-1N — truly "one aircraft for many missions."

New name, new look, revised publication, expanded contents and focus . . . and *new contest rules.*

There are hundreds of stories out there about safety (all disciplines), quality, and the command's airlift mission, needing to be told. Success stories and "not so successful" ones. Here is your opportunity to tell us first-hand (fiction or non-fiction) what you think—share your experiences with others.

We're looking forward to hearing from not only our regular contest participants, but from all of you out there not familiar with the "flying world." It's your chance to see your name in print, receive a one-year complimentary subscription to *The MAC Forum,* and maybe win an engraved desk set or plaque. Most importantly, your experiences may make our MAC World a little safer, a little better, and a little more productive. Isn't it worth it?

Entries must be original, previously unpublished, contain a safety, quality, or airlift message, and be postmarked no later than 30 April 1992 (Note change). Stories must be between approximately 1,000 and 3,000 words (about 6 to 14 double-spaced typewritten pages). Poetry should average 75 to 100 lines. Manuscripts must be typed, double-spaced, and submitted in two copies. Identify entries by title only, and attach a cover sheet indicating author's name, address, duty phone, unit, and home address. Please include a brief biography.

The contest is open to all. Entries qualifying under the above rules earn their author a complimentary one-year subscription to *The MAC Forum.* However, desk sets and plaques may be only awarded to military members and civilian employees of the Department of the Air Force and Air Reserve Components. Other entries may be selected under a Special Category.

We'll select six entries to be published in the magazine. Submit to:
The MAC Forum Writing Contest, 1992.
HQ MAC/SEE
Scott AFB, Illinois 62225-5101

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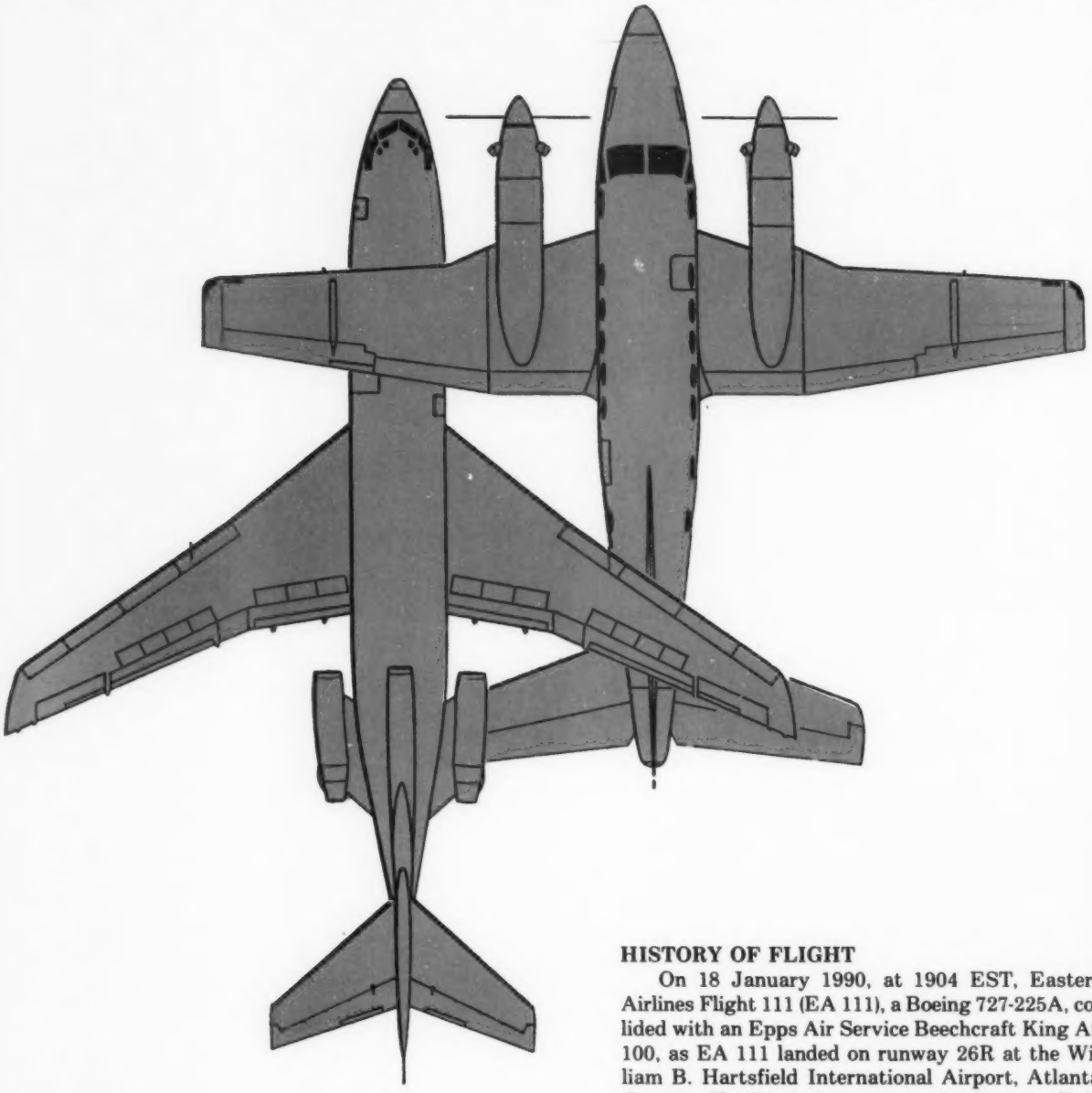


HISTORY OF FLIGHT

On 18 January 1990, at 1904 EST, Eastern Airlines Flight 111 (EA 111), a Boeing 727-225A, collided with an Epps Air Service Beechcraft King Air 100, as EA 111 landed on runway 26R at the William B. Hartsfield International Airport, Atlanta, Georgia. The King Air was preparing to turn off the runway after landing ahead of EA 111. Both airplanes were in radio contact with the tower controller

at the time. The King Air pilot was fatally injured and copilot seriously injured. There were no passengers on board, and no reported injuries on the B-727.

Eastern 111 was cleared to land about 1902, and the crew reported they flew the glide slope and localizer to the runway, landing approximately 1,200 feet from the threshold. The flightcrew said that after touchdown, they manually deployed the spoilers and lowered the nose of the airplane. As the Captain reached for the thrust reversers, the crew saw another airplane on the right side of the runway. The EA 111 flightcrew stated they were not aware of the other airplane until their landing lights illuminated it.

The First Officer stated that after he saw the other aircraft on the runway, the Captain steered the airplane to the left in an evasive maneuver; however, the B-727 continued through the landing rollout and its right wing struck the King Air. The Captain then steered EA 111 back toward the center of the runway, completing the landing rollout. The collision between the two airplanes was described by some passengers as a slight jolt, however, most of the passengers said the Captain's maneuvers to avoid the other airplane were more apparent than the actual collision.

The right wing of the B-727 struck the King Air on the aft fuselage just below the horizontal stabilizer. The empennage and left wing of the King Air were severed, and the nose gear collapsed. The cabin roof was severed from the point of impact forward to the frame of the cockpit windshield. There was no fire.

The B-727 received damage to the leading edge devices, flaps, upper surfaces, lower surfaces, and forward spar surface of the outboard portion of the right wing. The damage area included several prop slashes, surface scratches, and blue and white paint smears similar to the King Air color scheme.

ANALYSIS

The Eastern Airlines flightcrew was certified, trained, and qualified. There were no physiological factors or unusual cockpit distractions to prevent the flightcrew from seeing the King Air either on final approach or on the runway.

The King Air pilot-in-command was certified, trained, and qualified for the charter flight. The presence of a copilot-in-training did not contribute to the accident.

All FAA ATC personnel involved were certified, trained, and qualified for their duties. There were no apparent physiological disabilities detracting from their ability to perform at an acceptable level on the evening of the accident.

The air traffic volume in the Atlanta area at the time of the accident was average. There were no "flow control" or "holding" procedures in effect.

Both the Eastern Airlines flightcrew and King Air crew were familiar with the airport arrival procedures, runway layout, and taxi routes to their respective gates. Likewise, Atlanta ATC personnel were familiar with the King Air call sign. From previous experience, the controllers expected the airplane to exit runway 26R at taxiway Delta and proceed to the general aviaton ramp. The Safety Board could not find evidence to suggest the King Air flightcrew delayed their exit from the landing runway.

Weather conditions were at or above criteria for visual flight rules. However, there were scattered clouds at 500 feet and fog was present about the time of the accident. In post-accident interviews, neither the Eastern flightcrew, the King Air copilot, nor the air traffic controllers identified environmental factors as a constraint to the normal performance of their duties.

The King Air 100 was found not to be in compliance with airworthiness requirements because of deficiencies in the anticollision lighting system. An Epps Air Service flight line maintenance technician observed the King Air during its initial departure and noted that the red anticollision light atop the vertical stabilizer, and the white strobe light installed in the fuselage tailcone were not on. Further, the red anticollision light on the lower fuselage was not an approved type and was not functional. The "Beacon" switch controlling the red anticollision lights on both the top and bottom of the airplane was reported by ground personnel to be inoperative prior to the flight. The lighting discrepancies were not entered in the aircraft log book, and not repaired before flight as required by FAA regulations. The Safety Board was not able to establish that the pilot-in-command was aware of these lighting deficiencies, although lighting is part of the preflight checklist.

The Safety Board's examination of available light bulbs from the King Air confirms that some lights were not illuminated at impact. The filaments of bulbs removed from the navigation position and logo light systems were stretched, which is common to light bulb illumination at time of impact. In the lighting configuration of "NAV" lights only, the aft portion of the King Air would present only a single rear white position light, with an intensity of 20 can-

dle power. Thus, only limited conspicuity would be afforded in a field of view that included a variety of runway, taxiway, and other lights.

The Safety Board also noted that EA 111 was given a clearance to land and advised by tower they were in sight. No indication was given that they were number 2 for landing behind another airplane.

Had the controller provided traffic information to EA 111, the flightcrew's sense of situational awareness and motivation to search for a preceding airplane might have increased. Lacking such information, it appears the crew proceeded through their normal task of completing a routine night landing on a runway to which they had been cleared, unaware there was another airplane on that runway.

The fact that EA 111 had received a landing clearance did not relieve the flightcrew of responsibility to "see and avoid" other aircraft in their vicinity. However, in the absence of conspicuous lighting on the King Air, and without prompting from ATC to direct their attention to traffic ahead, it was extremely difficult, if not impossible, for the EA 111 flightcrew to detect the other aircraft on the runway.

ROLE OF AIR TRAFFIC CONTROL

The final controller was responsible for maintaining separation of succeeding airplanes on the approach to the outer marker. The monitor controller was responsible for maintaining separation of succeeding airplanes on the approach from the outer marker to within one mile of the runway. It is evident by the airspeed reductions issued by the monitor controller to the King Air that he was attempting to achieve additional separation between it and Continental flight 9687 (CO 9687), the DC-9 immediately preceding the two mishap airplanes. However, that same controller failed to compensate for the added closure rate that occurred between the King Air and the following EA 111.

The required separation between EA 111 and the King Air was two and one-half miles once inside the final approach fix. It appears that the monitor controller was late recognizing the potential conflict of decreasing separation between the two aircraft. About six miles from the runway, he assigned an airspeed change to EA 111; "reduce to your final approach speed." This speed assignment was not in conformance with the Air Traffic Control Handbook, which states that a controller shall advise an aircraft to increase or decrease to a specified speed in knots. In addition, the monitor controller did not receive an acknowledgement from the flightcrew of EA 111 and thus should not have *assumed* the instruction had been received and complied with. Therefore, the monitor controller initiated a sequence of events that caused the final approach interval spacing to quickly approach the minimum of two and one-half miles. Although he was relieved of direct responsibility for the ensuing loss of separation when the local controller transmitted "EA 111, you are in sight, cleared to land 26R," the Safety Board believes the monitor controller's action contributed to the speed differential and to the overtake that ultimately became a factor in the accident. At the time of the local controller's transmission, EA 111 was almost six miles from the runway and the King Air was about three miles out. However, the distance between the two aircraft was decreasing at an unacceptable rate, and was less than the required two and one-half miles separation as the King Air arrived over the runway threshold.

EA 111 had about a 45-knot closure rate on the King Air, and ATC radio transcripts indicate no action was taken to reduce the rate. In addition, radio transcripts indicate, and a personal interview confirmed, that the local controller became *distracted* by radio communication difficulties with the flightcrew of CO 9687. The local controller stated he did not observe the touchdown or rollout of the King Air.

At 1902:38, the local controller transmitted, "Continental ninety six eighty seven, half right, stay on bravo, hold short of two six left at the end." There was no response. At 1902:49, the local controller again attempted to call the flightcrew of CO 9687 without success. At 1903:03, the CO 9687 flightcrew transmitted, "Tower Continental ninety six eighty seven bravo two holding short." The local controller responded, "Ninety six eighty seven continue straight ahead to the end and hold short of two six left." This transmission was repeated at 1903:13. There were five more attempts made to establish communication with CO 9687. The last attempt was at 1904:22. Interspersed with these efforts, at 1904:18, the local controller cleared ASE 301 for takeoff on runway 26L.

At 1904:48, the flightcrew of EA 111 advised the local controller "Tower Eastern one eleven, we just hit an aircraft on the runway."

APPLICATION TO MAC

Everyone knows that mishaps are the result of a series of mistakes. The pilot of the King Air was flying an aircraft not properly illuminated, and three different controllers had the opportunity to take action to prevent this mishap. While none of the people involved should take sole responsibility for it, the individual who paid the highest price was the pilot who accepted an aircraft that could fly, but most certainly wasn't safe to do so.

Adapted from: *NTSB/AAR-91/03*

Flying-Hour Milestones

25,000

167 TAG
CMSgt. David H. Frazier

10,000

4 MAS
SMSgt. Gary R. Martin

313 MAS
MSgt. Jarvis L. Owens
MSgt. James A. Shadoff

732 MAS
Maj. Donald W. Sloan
CMSgt. Harold J. Greenlee
SMSgt. Robert Schlachter

7,500

4 MAS
CMSgt. Claude T. Newbold
MSgt. Keith R. Thomas
TSgt. Craig A. Cox
SSgt. Richard A. Haughian
SSgt. Eric L. Clever

5 MAS
MSgt. Cecil L. McConathy

36 MAS
TSgt. Mark E. Lewis

57 MAS
MSgt. Alfonso Sullivan
TSgt. Leon J. Kurcewicz
TSgt. Alfredo R. Ramos

130 TAS
SMSgt. William D. Martin

139 TAG
Lt. Col. Raymond C. Becker
SMSgt. John B. Kephart

443 MAS
TSgt. Michael E. Holman

616 MAG
Col. Sherman W. Bear

772 TAS
MSgt. Robert V. Schronk

1550 CCTW
MSgt. Ira W. Allen

5,000

ARS
Maj. Bennet W. Jones

4 MAS
MSgt. Lynn D. Husbyh
TSgt. Eugene C. Hastings
TSgt. Don C. Ratliff
TSgt. Jerry G. Tecca

36 MAS
Lt. Col. William H. Dudley/CC
Lt. Col. William H. Mills
Maj. Steven R. Knudsen
MSgt. Robert W. Savary
MSgt. James A. Williams
TSgt. John W. Green
TSgt. Thomas D. Lee
TSgt. Scott R. Little
SSgt. Ted K. Beck
SSgt. Alan L. Mann
SSgt. Michael D. Miller

56 MAS
Lt. Col. Charles L. Hudson

57 MAS
SMSgt. Cecil R. Fultz
MSgt. William R. Kennedy
TSgt. Gary E. Snyder
SSgt. Donald R. Buescher

60 MAW
Col. John B. Sams, Jr./CC

62 MAW
Col. John T. Loughran
Col. Edwin G. Webb, Jr.

63 MAW
Col. Robert F. Neal/CC

130 TAS
SMSgt. Gary L. Thacker
MSgt. Dennis R. Chambers

139 TAG
Lt. Col. Paul F. Antes
Lt. Col. Nelson W. Dwight
Maj. Vernon W. James
Maj. Craig A. Trimble
SMSgt. Earl A. Huskamp
MSgt. Roy R. Poindexter

313 MAS
Lt. Col. Dudley W. Boone
Lt. Col. Donald M. Davis
Maj. Robert S. Graves
Maj. Erik L. Mathieson
Maj. James J. Muscatell
MSgt. Charles E. Priddle

443 MAS
Maj. Michael E. Jackson
Capt. Don M. Roberson
MSgt. Mario A. Castillo
MSgt. Richard J. McCormick
MSgt. William R. Tidrick
MSgt. Carl E. Thornton

616 MAG
Maj. Charles F. Donahue, Jr.
Maj. James H. Summers, Jr.

772 TAS
SSgt. Raymond P. Higgins

907 TAG
Lt. Col. Charles F. Hanks, III.
Lt. Col. Thomas F. Kollin
Lt. Col. John S. Wilson
Maj. Kenneth N. Snyder
TSgt. Gerald R. Born

939 ARW
MSgt. Lawrence L. Morris

1550 CCTW
Col. John L. Davis
MSgt. Arthur Burkett

2,500

ARS
Maj. James J. Gilboy
SMSgt. Terry E. Caffery
TSgt. Norman J. Redenshek
TSgt. Steven G. White

4 MAS
Capt. Scott E.Bosselman
Capt. Clark A. Clingenpeel
Capt. James P. Covel
Capt. Edward J. Creech
Capt. Daren W. Dirkse
Capt. Terry L. Grunden
Capt. Mark S. Hershman
Capt. Michael E. Lally
Capt. Robert A. Nissen
Capt. John M. Thornborough
MSgt. Michael D. Proffitt
TSgt. Kenneth S. Brown
TSgt. Bernard D. Sisco
SSgt. Donald L. Bower, Jr.
SSgt. Dennis D. Faber
SSgt. Chad R. Richardson
SSgt. Bob D. Robinson
Sgt. Kenneth J. Campbell
Sgt. Kevin J. Kassman
Sgt. Keith J. Schnug

11 AAS
Capt. Dale A. Churovich
Capt. Russell D. Jensen
Capt. Stephen A. Holmes

16 TATS
Capt. Scott K. Cummings
Capt. Stuart L. Haire

36 MAS
Capt. William A. Anonsen
Capt. Mark A. Buker
Capt. Daniel G. Hargrove
Capt. Daniel G. Isaacs
Capt. Chris M. Jellison
Capt. Mark E. Mozden
Capt. John M. Nunez
Capt. George H. Otto, Jr.
Capt. Russell R. Parr
Capt. Anthony D. Stanley
Capt. Steven W. Tank
Capt. Michael A. Briese
TSgt. Jerri L. Blanchette
TSgt. Robert E. Peterson
SSgt. John B. Billings
SSgt. Raymond Cabral
SSgt. Garry Massengill
SSgt. Terrence J. Miyoshi
SSgt. Raymond D. Olrick
SSgt. James B. Raring
SSgt. Anthony M. Sigler
SSgt. William Syhlman, III.
Sgt. Michael D. Betts
Sgt. Robert W. Boesh
Sgt. Stephen L. Chatnick, III.
Sgt. Michael G. Lowe

57 MAS
Capt. Robert T. Jones
Capt. Mark A. Simon
SSgt. Russell Graham

97 MAS
TSgt. Gregory C. Flynn
TSgt. Thomas C. Morawek

130 TAS
Maj. Arthur L. Crimmins
Maj. Howard Franklin, III.
Capt. Dennis M. Bailey, III.
Capt. William D. Deskins
Capt. Dale A. Goff
Capt. Jerome M. Gouhin
Capt. Loda R. Moore
Capt. Gary L. Stewart
TSgt. Joseph D. Hurd
TSgt. Dewey R. Rankin
TSgt. Steve L. Worley
SSgt. Charles R. Cobb, Jr.
SSgt. Carl D. Summerfield

139 TAG
Maj. Randy R. Law
Capt. Rodney D. Rumpf
TSgt. Rickey R. Ellis
TSgt. Robert J. Shalz

160 TAG
Capt. Earl B. Condie

313 MAS
Capt. Lee A. Erickson
Capt. Jerome C. Hopper
Capt. Maryanne Miller
1st. Lt. James F. Kline
TSgt. Christian R. Barni
TSgt. Richard R. Randall

907 TAG
Maj. Robert G. Shondel
Capt. Robin W. Thompson
SMSgt. Ronald D. Craig

Det 2, 1401 MAS
Capt. Len R. Pace
Capt. David B. DeLuca

Det 4, 1401 MAS
Capt. Gregg K. Lloyd

1402 MAS
Capt. Terry Hunter

1,000

ARS
Capt. Richard B. Butler
Capt. Dennis D. Janiske
Capt. David A. Morgan
Capt. John T. Coffindaffer
Capt. Gary W. Hill
TSgt. Daniel L. Inch

Ranks and units are those at time of award.

C.R. TERRO

A Day At The Fair

"MAC 456 flight, you're cleared inbound on the 'Arch-1' arrival for your practice fly-by," announced the controller.

"Roger that," echoed the Andropolis of the Airways, as C.R. Terror led his MAC Mercenaries on their practice run. The annual Midwest celebration was about to get under way and, despite the objections of Col. Fang, C.R.'s boss, the Fleet-Winged Warrior himself was about to lead the MAC formation on a 'one-of-a-kind' excursion of the Mississippi River front.

"Major Terror," beckoned L.S. (Long-Sufferin') Sam, the Major's trusty copilot, "this is just a practice run. We're supposed to stay well clear of 'The Arch' until the actual festivities start."

"Nonsense, m'boy," barked C.R. "Practice makes perfect. Besides, when MAC warriors darken the skies with their aluminum overcast, the fans expect a show of proportional dimensions."

The Fleet-Winged Flyboy banked his giant C-5 Galaxy sharply as the mixed formation followed in close proximity. Each of MAC's finest struggled to maintain position against the unrealistic demands of their formation leader. All aircraft managed to fall into position as the impressive display of MAC's fleet crossed the riverfront area. Despite the efforts of the leader, the practice was a success and little was left but the debrief.

"Major Terror," boomed an incensed C-141 AC, "after today, I wouldn't follow you to the men's room if you had a map!"

"I wouldn't follow you that far," echoed an equally irate C-9 pilot.

"If you were a '130 pilot, I'd request a transfer," screamed an incensed Herk driver.

"Now gentlemen," soothed C.R., "this was but a mere practice. I hardly meant for each and every one of you to follow me beneath that wondrous 'arch'. We're here to show these folks the glories of our illustrious machines. Stretching the rules a bit will only make them more appreciative of the wonders we have to display."

Numerous rounds of bickering resulted in little accomplishment. The fantastic fortitude of the usually unflappable Major reached fever pitch in the closing rounds of argument as he promised to be on his best behavior for the 'real thing' the following day.

The Magic Major's eyes began to droop as he wheeled his emerald-green Jag into the driveway of Terror Manor. It had been a harrowing day, and all C.R. could think of was sleep.

Dreamland came easily, and soon the Fabulous Flyboy was again winging his way through columns of spiraling cumulus in his Galaxy. Marginal weather conditions encompassed the entire local flying area as the formation assumed position for 'the real thing'. Endless radio chatter, mostly from the left seat of the lead aircraft, kept the situation in a general state of confusion.

"MAC 456 flight," announced the controller, "you're cleared inbound on the 'Arch 1' arrival. Descend to 2,000 feet and advise cancelling IFR."

"456, WILCO," boomed the Ace of the Airways. "See, Sammy m'boy, the Dispensers of Weather Wisdom have blown it again. We shall prevail."

"Now boss," cautioned L.S. Sam, "remember your promise. You said you would behave today."

"And so I shall, m'boy," mumbled the Delirious Dreamer, "and so I shall."

The dream continued as the illustrious C.R. Terror (at least in his dreams) led the formation down into the darkness below. Despite warnings from the rest of his flock, the Fleet-Winged MAC Warrior pressed lower . . . and lower . . . and lower.

The 2,000-foot restriction was but a memory when they received a radio call from the rest of the formation saying they were abandoning the run-in for weather and heading home. Not to be deterred, the Magic Major was oblivious to the warnings of his crew as he shouted, "there it is . . . 'the Arch'. We made it!"

The wind-screen of the Giant Galaxy took on an unusually bright and golden hue as the crewmembers peered through the thick haze... a haze which revealed, in startling detail, not one arch, but two. . . joined at the middle. . . a set of *golden arches.*

"Pull up," screamed Sammy, as the Galaxy Grappler honked back on the yoke, sending hungry fast-food diners diving for cover.

The scene changed as the Boisterous Buffoon found himself in an eerie type of courtroom setting. It was fog-shrouded and he thought he was alone with the exception of one other person sitting with his back to C.R., behind a large judge's bench. The individu-

al looked strangely familiar, but the Major couldn't quite make out the figure through the haze. Then, it hit him . . . .

The apparition turned, and C.R.'s eyes widened as the fog revealed a figure dressed in a clown outfit. He had orange hair and a big red nose. This clown, however, wasn't laughing. Quite the contrary. As the figure spoke, an icy chill ran the length of C.R.'s spine.

"Major C.R. Terror, I presume . . . . You have been charged and brought before this court for hideous crimes involving safety violations; you have neglected to follow the rules of good judgment and common sense; above all, you have failed to heed the warnings of weather forecasters and your fellow aviators.

A huge spotlight illuminated what appeared to C.R. to be a jury box. There, to the startled major's surprise, sat the members of his formation.

"Members of the jury," beckoned the clown, "how do you find the defendant?"

"Guilty! Guilty! Guilty!" they all shouted in unison.

With that, the huge hand of the clown came down with a thunderous blow that sent C.R. upright in his bed.

The drive to work that morning was slow and tedious. C.R.'s mind was light years away as he pondered the revelations of the previous night. As he wheeled into the squadron parking lot, the usually Ambivalent One came to a definite conclusion concerning his future: he vowed to follow the rules and listen to suggestions and opinions of others.

The flyby went off without a hitch. To the delight and surprise of all, the Marvelous Major led his troops with expert precision. He received praise and accolades from all at the debriefing, including a dumbfounded Colonel Fang.

With Sammy's pickup in the shop for a major overhaul, C.R. graciously volunteered to drop the young aviator off on the way home. "You know, boss, you really surprised everybody today. I don't think Colonel Fang believes it yet."

"Well, Sammy, now you're beginning to understand what I've been trying to get through to you all these years. It's all a matter of skill and leadership and . . . ."

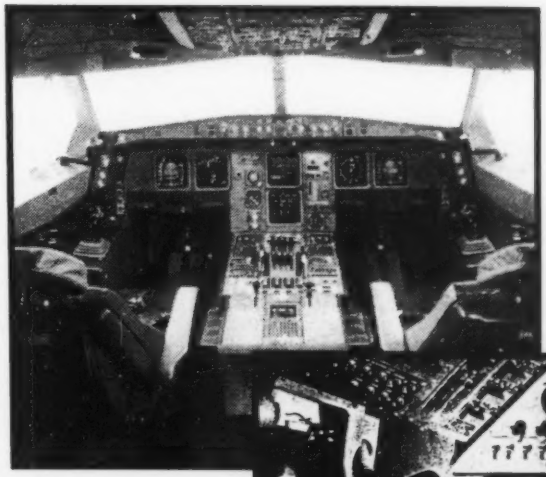
"Er, boss," interrupted Sam, "I'm kind of hungry after such a tough flight. How about if we pull in some place and get a quick bite to eat."

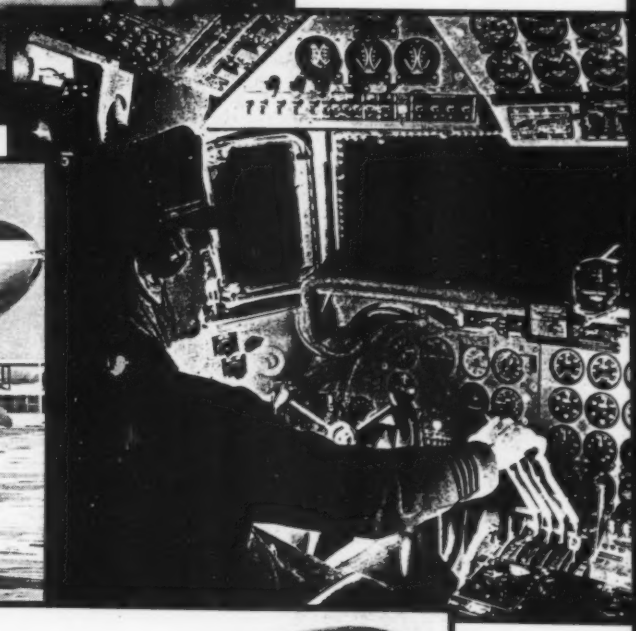
"Excellent idea m'boy, and I've got the perfect place. After all, I think we deserve a break today."

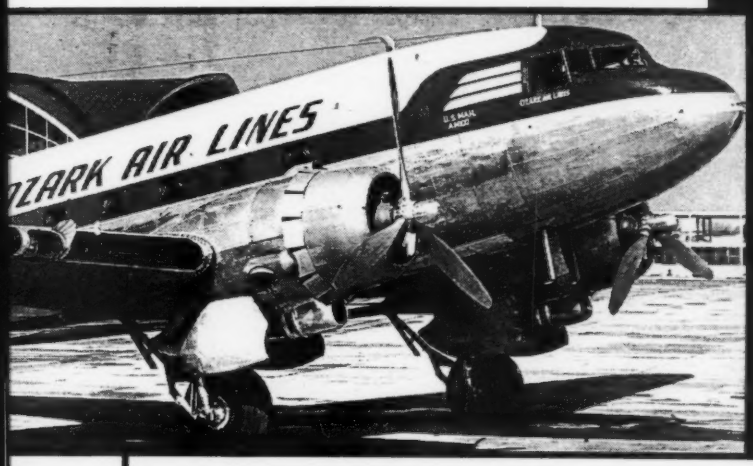
Optimizing Human Beings

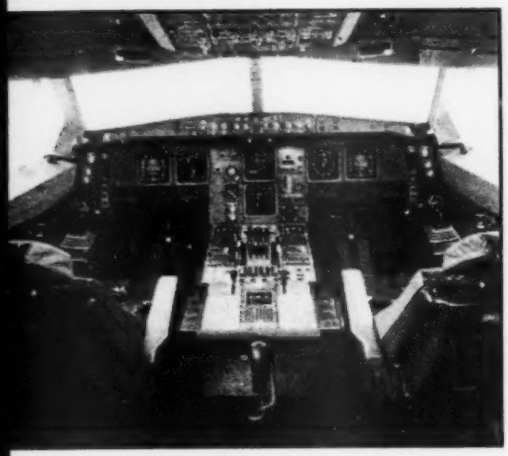
Pilots in the era of the automated airplane.

Aviation mishaps are normally attributed to aircraft design, aircraft maintenance, weather, or human operational error. Of these, only the human element can directly influence the degree of havoc other factors play in a mishap. The human factor can take a well designed and maintained aircraft up in good weather and crash, or it can manage any combination of poor design, maintenance, or weather factors and complete the mission. The typically uneventful flight from New









York to Los Angeles is the result of a professional crew in a well-maintained, technologically advanced aircraft that has the support of similarly high-level flight planning and air traffic control on the ground. If a weak link exists apart from the human element, the human element can, in most cases, compensate for that shortcoming and prevent an accident. This is evident every day, as aircrews routinely land mechanically-hobbled planes, most dramatically in the case of the Sioux City, Iowa, crash of a United DC-10, where a talented aircrew maneuvered an unsteerable plane with engine thrust alone—a procedure not covered in the training manual, to be sure.

Pilots have, for these heroic reasons, been scrutinized more than any other transportation worker. Hollywood's stock pilot-hero persona ranges anywhere from fiftyish, fatherish, and unruffled by surprises, to a brash, daring young man in his flying machine. The military and civilian industry have gone to great lengths to "get inside" the pilot psyche in an effort to determine the ideal personality type for pilot candidates. Depending on the test, ideal pilot personalities may be fastidious and overcautious; brooding and antisocial; or extrovert, risk-taking, "Top Guns."

The captain's traditional absolute charge of an airplane has seen equal study. Some studies suggest the pilot could benefit from the suggestions (and even overrulings) of other aircrew members, while others denounce such flight-by-committee theories.

It is clear that the aircrew, and pilot in particular, are well-cared for in the scheme of aviation safety priorities. Yet the challenge in the coming years will be to pay even more attention to this human element.

Dr. Robert Besco authored numerous papers on human performance factors in aviation. He notes that, as technology became more advanced, with redundant and otherwise fail-safe systems being integrated into new and existing aircraft, mistakes made by aircrews were less likely to result in harm to the aircraft, and more likely to foster complacency in the aircrew.

The technology advances Besco refers to are only the beginning of what promises to be a revolution in aircraft operation and navigation; the pilotless airplane. "Pilotless airplane" is now and will continue to be an exaggeration. Although technology exists allowing for the humanless movement of trains across the country, no human can accept or trust such an arrangement long enough to implement it, as no airline passenger would likely board a plane without passing a gray-templed captain in a blue suit on the way past the cockpit.

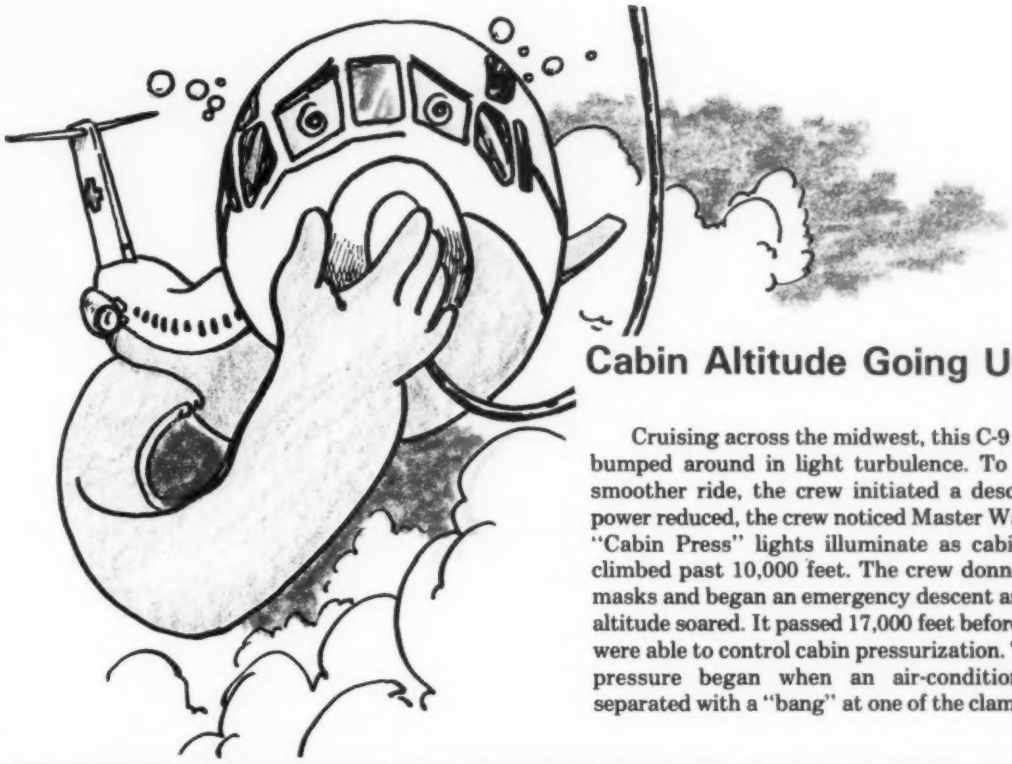
The debut of the Airbus 320 and other highly-automated planes constitute the early writing on the wall. Aircraft technological advances will continue to lighten the flying load on aircrews, while simultaneously moving them toward new responsibilities such as weather surveillance, navigation, and in-flight system (read computer) optimization. The temptation will be to focus training less on the business of flying the plane, and more on the business of maintaining the complicated systems that keep it flying.

Recently, a so-called automatic airplane was put in a holding pattern by its crew. When the time came to exit the hold, the airplane wouldn't budge. After several passes through cockpit checklists and a call to the plane's manufacturer, the crew realized the terrible truth familiar to deskbound computer users; in order to break the computer's hold on flight controls, the onboard computer needed to be rebooted! This necessitated the shutdown of both engines and gave the aviation world a few more gray-templed pilots.

Ignoring the stock science fiction climax of this arrangement (illustrated in the decidedly nonfiction example above) it's evident the aviation industry needs to put in place training and retraining that stimulates and educates pilots who must in the future be asked to do two jobs: work the computer flying the plane, and fly the plane when the computer can't.

A tradition of checks and more checks—by manufacturers, pilots, and government regulatory agencies—is already well established in the aviation industry. While it's not without its critics, the aviation world offers one of the safest forms of transportation. As aviation enters the realm of true automation, computers will perform many of the double-checking tasks we now depend upon humans to do. The challenge will be to put humans to the task of understanding their role in this change—and in continuing to improve on the vigilance that has made aviation one of the most convenient, reliable transportation forms.

Adapted from *The Aviation Safety Monitor*

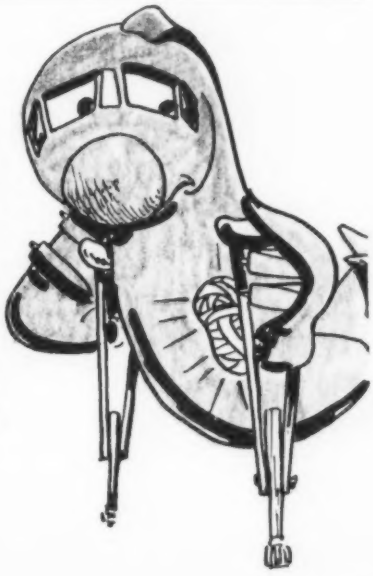


Cabin Altitude Going Up

Cruising across the midwest, this C-9 was being bumped around in light turbulence. To provide a smoother ride, the crew initiated a descent. With power reduced, the crew noticed Master Warning and "Cabin Press" lights illuminate as cabin altitude climbed past 10,000 feet. The crew donned oxygen masks and began an emergency descent as the cabin altitude soared. It passed 17,000 feet before the pilots were able to control cabin pressurization. The loss of pressure began when an air-conditioning duct separated with a "bang" at one of the clamped joints.

A Rare Failure

During preflight, the scanner of a C-141 crew noticed a failed left main landing gear strut assembly and that a piece of metal approximately nine inches long had broken off. No one seemed to know when the strut failed; however, a piece of metal found on the runway the previous day was eventually identified as the missing section. Investigation revealed the strut was installed in 1987 and accumulated 4,976 hours, with 14,116 landings. The struts are changed every five years and inspected during isochronals on a regular basis. Metallurgical analysis revealed the cause of failure was stress corrosion. The metal was scratched and two dissimilar metals, in contact with each other and in the presence of moisture, will corrode. Engineers stated there is nothing that can, or should, be done to correct the problem. The frequency of this type of failure is rare and does not warrant corrective action. Rare unless it happens to you!



QUICKSTOPPERS

Sure It's Been Drained

Takeoff and climbout were uneventful for this C-130 . . . until a fuel transfer pit cart began to leak diesel fuel. The strong diesel fumes caused some passengers to experience irritation; the crew accomplished an emergency return to get the passengers back on the ground and into some fresh air. Examination revealed a hose leading from the tank to the engine was displaced and leaking. A mere one inch of diesel fuel remained in the tank and about a gallon spilled on the cargo floor. By the way, diesel fuel is often used as the purging liquid and is now considered flammable.

Watch Out For The Drip

During a low-level training mission, the Herk's loadmaster reported a squeaking noise coming from the direction of the aileron actuator assembly. The inquisitive flight engineer went to the cargo compartment to investigate. To get a closer look, or maybe better listening position, he climbed on top of a heavy equipment load conveniently located below the suspected boost pack. As he looked up, a drop of hydraulic fluid from the aileron boost pack drain pan scored a PI in his right eye. The mission was terminated so the FE could be treated at the local hospital. It's a good idea to wear some kind of eye protection when looking for suspected drips or squeaks. If you do get something in your eye, wash it with lots of water to remove hydraulic fluid, then seek professional help.

Dear Readers:

As in all other areas of the military these days, we at *The MAC Flyer* are not immune to the constraints of budget cuts and manpower draw-downs. After 35 years of publication, we are being forced by these constraints to consolidate our magazine. As a result, we are combining the efforts of the current staff with those of the Airlift Operations School's *Airlift Journal* to publish a single product. This publication, entitled *The MAC Forum*, will hit the streets on 1 Jan 1992. The new magazine will include not only flight safety-related material, but ground, explosive, and nuclear surety-related articles. We will also address airlift and quality subjects. The magazine will look pretty much the same as *TMF* (note the similarity of initials) but will expand to 40 pages and will be published every other month.

Rest assured, we will do our best to retain the departments which interest you the most. Being a quality type organization, we don't take our readership surveys lightly. We plan to continue C.R. Terror, Mishaps With A Moral, Quickstoppers, Instrument Quizzes, and Contest Stories, to name a few.

We view this new endeavor as a challenge. It's a challenge that won't succeed, however, without your help and input. It will be an evolving process and the looks and content of the magazine may change from one edition to the next as we find out what works and what doesn't. Don't lose heart. Stick with us and we'll all get there together. Above all, let us know how we're doing. About six months down the road, after we've gotten through the initial growing pains, we're going to provide a readership survey. This will be your prime opportunity to let us know what you like and what you simply can't stand. We'll adjust accordingly. Well, that's it. Hang with us, and remember--*this book's for you!*

The Editors

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IF YOU THINK FLYING "STANDBY" IS ROUGH TODAY, YOU SHOULD HAVE SEEN 1948.

U·M·I

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